

Western Alps Early Cretaceous Accretionary Complex of the Valaisan ocean.

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Based on detailed field investigations and structural mapping in the Petit-Saint Bernard Pass area (French-Italian border), the Versoyen Complex is newly defined as an imbrication of four structural units : one, the remnant of the Valaisan ocean floor (basalt and black schist unit) and three subunits of “schistes à blocs” differentiated on the origin of their blocks: oceanic, continental or a mix of both, embedded in a matrix of grey micaschists. The Valaisan rift breakup started during the Tithonian, when Spain drifted away from Newfoundland and the North-Atlantic opened. The rift propagated eastwards in the Alpine region through pre-existing Variscan structures such as the Zone Houillère separating the Briançonnais domain from the External Crystalline Massifs. The Subbriançonnais domain became the northwestern Briançonnais passive margin in this process. The Versoyen Complex was initially part of this Valaisan extended margin characterised by Briançonnais basement rift allochthons. Due to the southward subduction of the Valaisan Ocean, this passive margin was later on deformed through intense compressional shearing tectonics, developing a schistes à blocs fabric, and a large-scale imbrication of the former allochthons. Radiolarians found within the Versoyen grey micaschists have been attributed to the Late Jurassic, Middle Cretaceous epoch. Additional stratigraphic and geodynamic constraints allow us to restrict the grey micaschists deposition from the Aptian to Cenomanian times. We interpret the Versoyen Complex, in its current outcropping structural configuration, as a pre-alpine Cretaceous tectonic mélange, representing a subduction accretionary prism, formed during the closure of the Valaisan Ocean. The Paleozoic continental basement rocks of the Versoyen Complex tectonic mélange, initially rift allochthons, are now outcropping as blocks and slivers within an Early Cretaceous grey micaschists matrix. A geochemical and U/Pb dating review at the scale of the Western Alps shows that all these rocks are part of the Briançonnais continental basement corresponding to a late Variscan back-arc environment. A new geodynamic model for the evolution of the Valaisan Ocean is proposed based on all the field observations in the Petit-Saint-Bernard Pass area and on the Alpine plate tectonic reconstructions at the scale of the larger western Tethyan domain. The understanding of the fascinating geology around the Petit-Saint-Bernard Pass remains and will continue to remain a key area to unravel the geodynamic evolution of the Western Alps.

Mots-Clés : Valaisan ocean, Versoyen Complex, accretionary prism, tectonic mélange, radiolarians, geochemistry, U/Pb dating, Briançonnais, Petit-Saint-Bernard Pass.